

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Kazutaka OKAMOTO ET AL.

Serial No.: Not Yet Assigned

Filed: December 21, 2001

Title: COOLING PLATE AND MANUFACTURING METHOD THEREOF, AND
SPUTTERING TARGET AND MANUFACTURING METHOD THEREOF

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Please amend this application as follows prior to
examination. A version of the amended claims with markings to
show the changes made is attached to this Reply.

Please substitute the Abstract of the Disclosure
attached to this preliminary amendment for that appearing on page
47 of the application.

Please amend claims 1-19, 21, and 23 as follows prior to
examination.

1. (Amended) A cooling plate comprising a groove, which
becomes a passage of a coolant, inside a body thereof, wherein
the groove is covered with a lid with a width larger than the
groove, the lid is joined to the body by friction stir welding,
and a weld bead formed by the joining are outside the passage.

2. (Amended) A cooling plate comprising grooves of a
closed passage, which become a plurality of independent passages

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of a coolant, inside a body, wherein the grooves are covered with lids, the lids are joined to the body by friction stir welding, and a weld bead formed by the joining are outside the passages.

3. (Amended) A cooling plate comprising a groove, which becomes a passage of a coolant, inside a body, wherein the groove is covered with a lid, the lid is joined to the body by friction stir welding, and at least an end of a weld bead formed by the joining is formed in the body except a joining.

4. (Amended) A cooling plate comprising a groove, which becomes a passage of a coolant, inside a body, wherein the groove is covered with a lid having a width larger than the groove, the lid is joined to the body by friction stir welding and fusion welding, and a weld bead formed by the joining is outside the passage.

5. (Amended) A cooling plate comprising a groove, which becomes a passage of a coolant, inside a body, wherein one or more fins are provided inside the groove, the groove is covered with a lid having a width larger than the groove, the lid is joined to the body by friction stir welding, and a weld bead formed by the joining is outside the passage.

6. (Amended) A cooling plate comprising a groove, which becomes a passage of a coolant, inside a body, wherein the groove is covered with a lid, the lid is joined to the body by friction stir welding, and the passage is a passage closed within the body.

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7. (Amended) A cooling plate comprising a groove, which becomes a passage of a coolant, inside a body, wherein the groove is covered with a lid, the lid is joined to the body by friction stir welding, and an air vent is provided in a portion forming the passage.

8. (Amended) A cooling plate comprising a groove, which becomes a passage of a coolant, inside a body, wherein the groove is covered with a lid, the lid is joined to the body by friction stir welding, the lid is joined by friction stir welding owing to insertion of a rotation tool having a shoulder and a pin, and at least an end of a weld bead of the joining is out of the joining.

9. (Amended) A cooling plate comprising two or more U grooves per one meter width, which become passages of a coolant, inside a body, wherein the grooves are covered with lids, the lids are joined to the body by friction stir welding, and the passages are passages closed within the body.

10. (Amended) A cooling plate comprising a longwise M-shaped groove, which becomes a passage of a coolant, inside a body defining a long plate, wherein the groove is covered with a lid, the lid is joined to the body by friction stir welding, and the passage is a passage closed within the body.

11. (Amended) A sputtering target comprising a target material for sputtering joined on the cooling plate according to

claim 1.

12. (Amended) A manufacturing method of a cooling plate that has a first groove, which becomes a passage of a coolant, and a second groove, which has width larger than the first groove and receives a lid on the first groove, inside a body, places the lid on the second groove, and is joined to the body, comprising joining the lid and the body together by friction stir welding owing to insertion of a rotation tool having a shoulder and a pin so that a weld bead formed by the joining may become outside the passage while the joining is performed.

13. (Amended) A manufacturing method of a cooling plate which has a groove, which becomes a passage of a coolant, inside a body, and in which a lid is joined to the groove, comprising joining the lid and the body by friction stir welding owing to insertion of a rotation tool which has a shoulder and a pin, and making the groove be a left-hand side to a traveling direction of joining when the rotation tool rotates to the left and a right-hand side to a traveling direction of joining when the rotation tool rotates to the right while joining the lid and the body.

14. (Amended) A manufacturing method of a cooling plate which has a groove, which becomes a passage of a coolant, inside a body, and in which a lid is joined to the groove, comprising joining the lid and the body by friction stir welding owing to insertion of a rotation tool which has a shoulder and a pin, and setting a center of the rotation tool in a position which is

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apart from an edge of the groove by a radius of the pin or more while joining the lid and the body.

15. (Amended) A manufacturing method of a cooling plate which has a groove, which becomes a passage of a coolant, inside a body, and in which a lid is joined to the groove, comprising joining the lid and the body by friction stir welding owing to insertion of a rotation tool which has a shoulder and a pin, wherein a joining direction where the rotation tool rotates is a direction opposite to a rotational direction of the rotation tool when the joining direction by the rotation tool passes a curve while joining the lid and the body.

16. (Amended) A manufacturing method of a cooling plate which has a groove, which becomes a passage of a coolant, inside a body, and in which a lid is joined to the groove, comprising joining the lid and the body by friction stir welding, wherein joining becoming a folding of the joining is made to be joining by two straight lines while joining the lid and the body.

17. (Amended) A manufacturing method of a cooling plate which has a groove, which becomes a passage of a coolant, inside a body, and in which a lid is joined to the groove, wherein a joining of the body and the lid has a projection thicker than other sections, comprising performing joining to the projection by friction stir welding owing to insertion and movement of a rotation tool having a shoulder and a pin.

18. (Amended) A manufacturing method of a cooling plate

which has a groove, which becomes a passage of a coolant, inside a body, and in which a lid covers the groove, comprising joining the lid to the body by friction stir welding, and providing an air vent in a portion forming the passage while the lid and the body are joined by friction stir welding.

19. (Amended) A manufacturing method of a cooling plate which has a groove, which becomes a passage of a coolant, inside a body, and in which a lid covers the groove, comprising joining the lid to the body by friction stir welding, and forming at least an end portion of the joining out of the joining while the lid and the body are joined by friction stir welding owing to insertion of a rotation tool which has a shoulder and a pin.

21. (Amended) The manufacturing method of a cooling plate according to claim 12, wherein, after the lid and the body are partially and temporarily joined by fusion welding or friction stir welding beforehand, a whole joining is joined by friction stir welding.

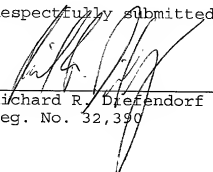
23. (Amended) The manufacturing method of a cooling plate according to claim 12, wherein a projection is provided in an insertion side of a joining of the body and the lid where the pin is inserted.

REMARKS

This Preliminary Amendment is being filed in order to improve the form of the claims prior to examination.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In each claim appearing below, deletions are bracketed and additions are underlined.

1. (Amended) A cooling plate comprising a groove, which becomes a passage of a coolant, inside a body thereof, wherein the groove is covered with a lid with a width larger than the groove, [and] the lid is joined to the body by friction stir welding, and a weld bead formed by the joining are outside the passage.

2. (Amended) A cooling plate comprising grooves of a closed passage, which become a plurality of independent passages of a coolant, inside a body, wherein the grooves are covered with lids, [and] the lids are joined to the body by [the] friction stir welding, and a weld bead formed by the joining are outside the passages.

3. (Amended) A cooling plate comprising a groove, which becomes a passage of a coolant, inside a body, wherein the groove is covered with a lid, [and] the lid is joined to the body by [the] friction stir welding, and at least an end of a weld bead formed by the joining is formed in the body except a joining.

4. (Amended) A cooling plate comprising a groove, which becomes a passage of a coolant, inside a body, wherein the groove is covered with a lid having a width larger than the groove, [and] the lid is joined to the body by friction stir welding and fusion welding, and a weld bead formed by the joining is outside the passage.

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5. (Amended) A cooling plate comprising a groove, which becomes a passage of a coolant, inside a body, wherein one or more fins are provided inside the groove, [and] the groove is covered with a lid having a width larger than the groove, [and] the lid is joined to the body by [the] friction stir welding, and a weld bead formed by the joining is outside the passage.

6. (Amended) A cooling plate comprising a groove, which becomes a passage of a coolant, inside a body, wherein the groove is covered with a lid, [and] the lid is joined to the body by friction stir welding, and the passage is a passage closed within the body.

7. (Amended) A cooling plate comprising a groove, which becomes a passage of a coolant, inside a body, wherein the groove is covered with a lid, [and] the lid is joined to the body by friction stir welding, and an air vent is provided in a portion forming the passage.

8. (Amended) A cooling plate comprising a groove, which becomes a passage of a coolant, inside a body, wherein the groove is covered with a lid, [and] the lid is joined to the body by [the] friction stir welding, [and] the lid is joined by friction stir welding owing to insertion of a rotation tool having a shoulder and a pin, and at least an end of a weld bead of the joining is out of the joining.

9. (Amended) A cooling plate comprising two or more U

grooves per one meter [wide] width, which become passages of a coolant, inside a body, wherein the grooves are covered with lids, [and] the lids are joined to the body by friction stir welding, and the passages are passages closed within the body.

10. (Amended) A cooling plate comprising a longwise M-shaped groove, which becomes a passage of a coolant, inside a body [that is] defining a long plate, wherein the groove is covered with a lid, [and] the lid is joined to the body by friction stir welding, and the passage is a passage closed within the body.

11. (Amended) A sputtering target[, wherein] comprising a target material for sputtering [is] joined on the cooling plate according to claim 1.

12. (Amended) A manufacturing method of a cooling plate that has a first groove, which becomes a passage of a coolant, and a second groove, which has width larger than the first groove and receives a lid on the first groove, inside a body, places the lid on the second groove, and is joined to the body, [wherein, while] comprising joining the lid and the body [are joined] together by friction stir welding owing to insertion of a rotation tool having a shoulder and a pin[, joining is performed] so that a weld bead formed by the joining may become outside the passage while the joining is performed.

13. (Amended) A manufacturing method of a cooling plate which has a groove, which becomes a passage of a coolant, inside

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a body, and in which a lid is joined to the groove, [wherein, while] comprising joining the lid and the body [are joined] by friction stir welding owing to insertion of a rotation tool which has a shoulder and a pin, and making the groove [is made to] be a left-hand side to a traveling direction of joining when the rotation tool rotates to the left[, the groove is made to be] and a right-hand side to a traveling direction of joining when the rotation tool rotates to the right while joining the lid and the body.

14. (Amended) A manufacturing method of a cooling plate which has a groove, which becomes a passage of a coolant, inside a body, and in which a lid is joined to the groove, [wherein, while] comprising joining the lid and the body [are joined] by friction stir welding owing to insertion of a rotation tool which has a shoulder and a pin, and setting a center of the rotation tool [is set] in a position which is apart from an edge of the groove by a radius of the pin or more while joining the lid and the body.

15. (Amended) A manufacturing method of a cooling plate which has a groove, which becomes a passage of a coolant, inside a body, and in which a lid is joined to the groove, [wherein, while] comprising joining the lid and the body [are joined] by friction stir welding owing to insertion of a rotation tool which has a shoulder and a pin, wherein a joining direction where the rotation tool rotates is a direction opposite to a rotational direction of the rotation tool when the joining direction by the rotation tool passes a curve while joining the lid and the body.

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16. (Amended) A manufacturing method of a cooling plate which has a groove, which becomes a passage of a coolant, inside a body, and in which a lid is joined to the groove, [wherein, while] comprising joining the lid and the body [are joined] by friction stir welding, wherein joining becoming a folding of the joining is made to be joining by two straight lines while joining the lid and the body.

17. (Amended) A manufacturing method of a cooling plate which has a groove, which becomes a passage of a coolant, inside a body, and in which a lid is joined to the groove, wherein a joining of the body and the lid has a projection thicker than other sections, [and] comprising performing joining to the projection [is performed] by friction stir welding owing to insertion and movement of a rotation tool having a shoulder and a pin.

18. (Amended) A manufacturing method of a cooling plate which has a groove, which becomes a passage of a coolant, inside a body, and in which a lid covers the groove, [wherein] comprising joining the lid [is joined] to the body by friction stir welding, and [while the lid and the body are joined by friction stir welding,] providing an air vent [is provided] in a portion forming the passage while the lid and the body are joined by friction stir welding.

19. (Amended) A manufacturing method of a cooling plate which has a groove, which becomes a passage of a coolant, inside

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a body, and in which a lid covers the groove, [wherein] comprising joining the lid [is joined] to the body by friction stir welding, and forming at least an end portion of the joining out of the joining while the lid and the body are joined by friction stir welding owing to insertion of a rotation tool which has a shoulder and a pin[, at least an end portion of the joining is formed out of the joining].

21. (Amended) The manufacturing method of a cooling plate according to claim 12, wherein, after the lid and the body are partially and temporarily joined by fusion [weld] welding or friction stir welding beforehand, a whole joining is joined by friction stir welding.

23. (Amended) The manufacturing method of a cooling plate according to claim 12, wherein a projection is provided in an insertion side of [an] a joining of the body and the lid where the pin is inserted.

ABSTRACT OF THE DISCLOSURE

A cooling plate includes a groove, which becomes a passage of a coolant, inside a body, and one or more fins are provided inside the groove. The groove is covered with a lid having width larger than the groove, and the lid is joined to the body by friction stir welding. A weld bead formed by the joining is outside the passage, and the weld bead formed by the joining is formed within the body. In a manufacturing method of a cooling plate that has a first groove, which becomes a passage of a coolant, and a second groove, which has width larger than the first groove and receives a lid on the first groove, inside a body, receives the lid on the second groove, and is joined to the body, while the lid and the body are joined together by the friction stir welding owing to insertion of a rotation tool having a shoulder and a pin, the joining is performed so that a weld bead formed by the joining may become out of the passage. A target for sputtering is joined to the cooling plate.

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